

**ABSTRACT**

1 The present invention provides an improved NMR sequence for detecting small amount  
2 of a substance having short NMR transversal relaxation in the presence of a large amount  
3 of a substance having long NMR relaxation. A sequence of pulses enables the original z-  
4 oriented magnetization vector of a substance to experience differing reorientation effects  
5 based on the relative transverse relaxation rate of the substance. After said pulse  
6 sequence, a substance with long transverse relaxation experiences a substantial inversion  
7 of its nuclear magnetization vector, while a substance with short transverse relaxation  
8 experiences a nearly zero value of its vector. After a determinable wait time, said vectors  
9 can be shown to experience recognizably different behavior under the application of a  
10 CPMG sequence of pulses. Appropriate wait time can be determined by zeroing out spin  
11 echoes during the CPMG pulse sequence.